

**CITY OF PHILADELPHIA
Department of Public Health
Public Health Services
Air Management Services**

Statement of Basis (SOB) - Plan Approval 06050A

To: File
From: Maryjoy Ulatowski, Environmental Engineering Specialist
Date: Revised 3/9/2015
Subject: 433 H-1 Heater – Establishing a lb/hr NOx limit during periods of start-up, shut-down, chemical washings, and dryouts.

Facility Information:

Facility ID: 1501
Facility Name: Philadelphia Energy Solutions Refining and Marketing (PES)
Address: 3144 Passyunk Avenue, Philadelphia PA 19145
Contact Person: Charles Barksdale Jr., Environmental Manager
Phone: 215-339-2074

Description:

The PES is requesting in this Plan Approval to establish a 5.0 lb/hr NOx emission limit for the 433 H-1 Heater during periods of start-ups and shutdowns. The 5.0 lbs/hr limit replaces the lbs/MMBTU limit during periods of start-ups, shut-downs, chemical washings, and dry-outs. No modifications to the actual heater or increase in throughput or capacities are requested.

The 433 H-1 Heater currently has a continuous emission monitor system (CEMS) for both nitrogen oxides (NOx) and oxygen (O₂), additionally it monitors the heater firing in Million British Thermal Units per hour (MMBtu/hr). The current NOx emission limit for the heater is 0.035 lbs/MMBtu on an hourly basis using CEMS; however, the facility is having a difficult time maintaining this emission limit during startups, shutdowns, chemical washings, and dryouts when firing (MMBTU) of the heater is very low. The lbs/MMBTU exceedance during these periods can be attributed to the following: (1) the firing of the heater is low and (2) the oxygen level in the heater is also high. Even though the actual concentration (ppm) of NOx is lower than the limit is met, the facility is having difficulty meeting the NOx emission requirements in lbs/MMBtu because of the lower denominator.

The Plan Approval Modification also updates requirements for Boiler House #3. The Plan Approval Modification removes the fuel oil limits for #3 Boiler House with a condition that #3 Boiler House shall only burn refinery gas per Consent Decree dated May 24, 2005, Civil Action No. 05-02866.

Summary:

PES is a major source as due to the facility's potential to emit Volatile Organic Compounds (VOC), Nitrogen Oxides (NOx), Particulate Matter less than 10 microns (PM-10), Sulfur Oxides (SOx), Carbon Monoxide (CO), and Hazardous Air Pollutants (HAPs).

Under Plan Approval 06050 dated 12/4/2006, the 433 H-1 Heater was modified to increase the permitted operating limit from 243 MMBtu/hr to 260 MMBtu/hr. No actual physical modification to the heater was requested under Plan Approval No. 06050. Plan Approval 06050 also established allowable emission limits for the 433 Heater for various pollutants including a 0.035 lbs/BMBTU limit based on hourly CEM data and a 39.9 tons per year limit.

Plan Approval No. 06050A, the modification, includes a 5.0 lb/hr limit for NO_x during periods of start-up shutdowns, chemical washing, and dryouts. During normal operations, the 0.035 lb/MMBtu limit still apply. The 5.0 lb/hour limit is approximately half of the current NO_x limit in lbs/hr if the heater is to run for 8760 hours per year (24 hours per day, 365 days per year). See calculations below:

Currently the annual emission mass limit for NO_x is 39.9 tons per year → this corresponds to a 9.1 lb/hr mass limit.

$$\frac{(\text{Annual Mass Limit in tpy}) \times (\text{lbs to ton conversion factor})}{\text{Operating hours per year}} = \text{lb/hr}$$

$$\frac{39.9 \text{ tons}}{\text{year}} \times \frac{(2000 \text{ lbs})}{(1 \text{ ton})} \times \frac{(1 \text{ year})}{(8760 \text{ hours})} = 9.1 \text{ lb/hr}$$

Based on the maximum permitted capacity and the current allowable 0.035 lb/MMBtu NO_x emission, the allowable lb/hr is as follows:

$$(\text{Maximum Permitted Capacity}) \times (\text{Allowable lb/MMBTU NO}_x \text{ Emission Limit}) = \text{lb/hr}$$

$$0.35 \text{ lb/MMBTU} \times (260 \text{ MMBTU/hr}) = 9.1 \text{ lb/hr}$$

The Plan Approval Modification has a 5.0 lb/hr mass limit for NO_x during periods of start-ups shut downs, chemical washings and dryouts which is much less than 9.1 lb/hr if the annual mass emission limit is converted to a lb/hr limit. Startup and shutdown periods for the heater can take up to 8 hours and usually occurs less than 5 times a year. Startup and shutdown periods are limited to 40 hours per rolling 12 month period. Chemical washing and dryout periods are limited to less than 144 hours per rolling 12 month period.

NSR/PSD

This Plan Approval modification does not increase any emission or through-put; therefore, not applicable to NSR or PSD.

NSPS /MACT /PA Code/ Air Management Regulations

All applicable requirements are carried over from the original Plan Approval 06050.